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②國玄東華大學

教學計劃表 Syllabus

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課程名稱(中文) Course Name in Chinese	高等機率論AB			學年/學期 Academic Year/Se	學年/學期 Academic Year/Semester			
課程名稱(英文) Course Name in English	Advanced Probability Theory							
科目代碼 Course Code	AM5390AB	系級 Department 碩士 & Year		開課單位 Course-Offering Department	應用數學系			
修別 Type	必修 Required	學分數/時 Credit(s)/Hou		3	3.0/3.0			
授課教師 Instructor	/謝思民							
先修課程 Prerequisite								
All for late of Courses Description								

課程描述 Course Description

Measure theoretical foundation of probability theory. Integration theory. Basic convergence theorems. Properties and essential results. Limit theorems.

課程目標 Course Objectives

建立以測度論為基礎的機率學架構 並建立重要收斂定理

Measure theory based probability theory with major limit theorems.

		課程目標與系專業能
		力相關性
	糸專業能力	Correlation between
		Course Objectives
	Basic Learning Outcomes	and Dept.'s
		Education
		Objectives
A	具備專業數學知識及邏輯推理能力。Have well-founded expertise in mathematics and be capable of logical reasoning.	•
	具備學習其它學科的能力,以期能邁向跨領域研究。Be able to study other fields of	
В	science so as to conduct interdisciplinary research in the future	
С	具備獨立思考與解決問題的能力。	
	Be capable of independent thinking and have the problem-solving skills.	

圖示說明Illustration : ● 高度相關 Highly correlated ○中度相關 Moderately correlated

授課進度表 Teaching Schedule & Content

週次Week	內容 Subject/Topics	備註Remarks
1	Measure spaces. Definitions of algebra and sigma algebra. Borel sigma algebra. Definition of measure space.	
2	Extension theorem. Uniqueness of extension. Lebesgue measure. Monotone convergence properties of measures.	
3	Random variables. Measurable functions. Basic properties. liminf and limsup of measurable functions.	
4	Distribution functions. Basic properties. Skorohod representation of random variable with specified distribution function	
5	Independence. The pi-system lemma. Borel-Cantelli lemmas.	
6	.Tail sigma algebra. Kolmogorov zero-one law	
7	Integration theory. Integrals of nonnegative measurable functions. Monotone convergence theorem. Fatou lemma.	

8	Linearity. Integrable functions. Dominated convergence theorem.						
9	期中考試週 Midterm Exam						
10	Definition of expectation. Convergence theorems. Markov inequality. Jensen's inequality.						
11	Monotonicity of Lp norms. Schwarz inequality. L2 theory. Orthogonal projection						
12	Modes of convergence.						
13	Modes of convergence.						
14	Modes of convergence.						
15	Law of large number.						
16	Central limit theorem.						
17	Central limit theorem.						
18	期末考試週 Final Exa						
	教學策略 Teaching Strategies						
✓ 課堂講	授 Lecture						
其他Mis	scellaneous:						
	教學創新自評 Teaching Self-Evaluation						
創新教學(Innovative Teaching)						
問題導	向學習(PBL) ■ 團體合作學習(TBL) 解決導向學習(SBL)						
翻轉教室 Flipped Classroom							
社會責任(Social Responsibility)							
在地實踐Community Practice							
跨域合作(Transdisciplinary Projects)							
■ 跨界教學Transdisciplinary Teaching ■ 跨院系教學Inter-collegiate Teaching							
業師合授 Courses Co-taught with Industry Practitioners							
其它 othe	r:						

學期成績計算及多元評量方式 Grading & Assessments									
配分項目	多元評量方式 Assessments								
Items	配分比例 Percentage	測驗 會考	實作 觀察	口頭 發表	專題 研究	創作 展演	卷宗 評量	證照 檢定	其他
平時成績 General Performance									
期中考成績 Midterm Exam	20%						~		
期末考成績 Final Exam	20%						~		
作業成績 Homework and/or Assignments	60%		~				~		
其他 Miscellaneous									

評量方式補充說明

Grading & Assessments Supplemental instructions

教科書與參考書目(書名、作者、書局、代理商、說明)

Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

- 1. Probability essentials. Jacob and Protter.
- 2. Probability with martingales. D. Williams.
- 3. Probability and measures: Billingsley.

課程教材網址(含線上教學資訊,教師個人網址請列位於本校內之網址)

Teaching Aids & Teacher's Website(Including online teaching information.

Personal website can be listed here.)

其他補充說明(Supplemental instructions)